

# Prairie Interfaces

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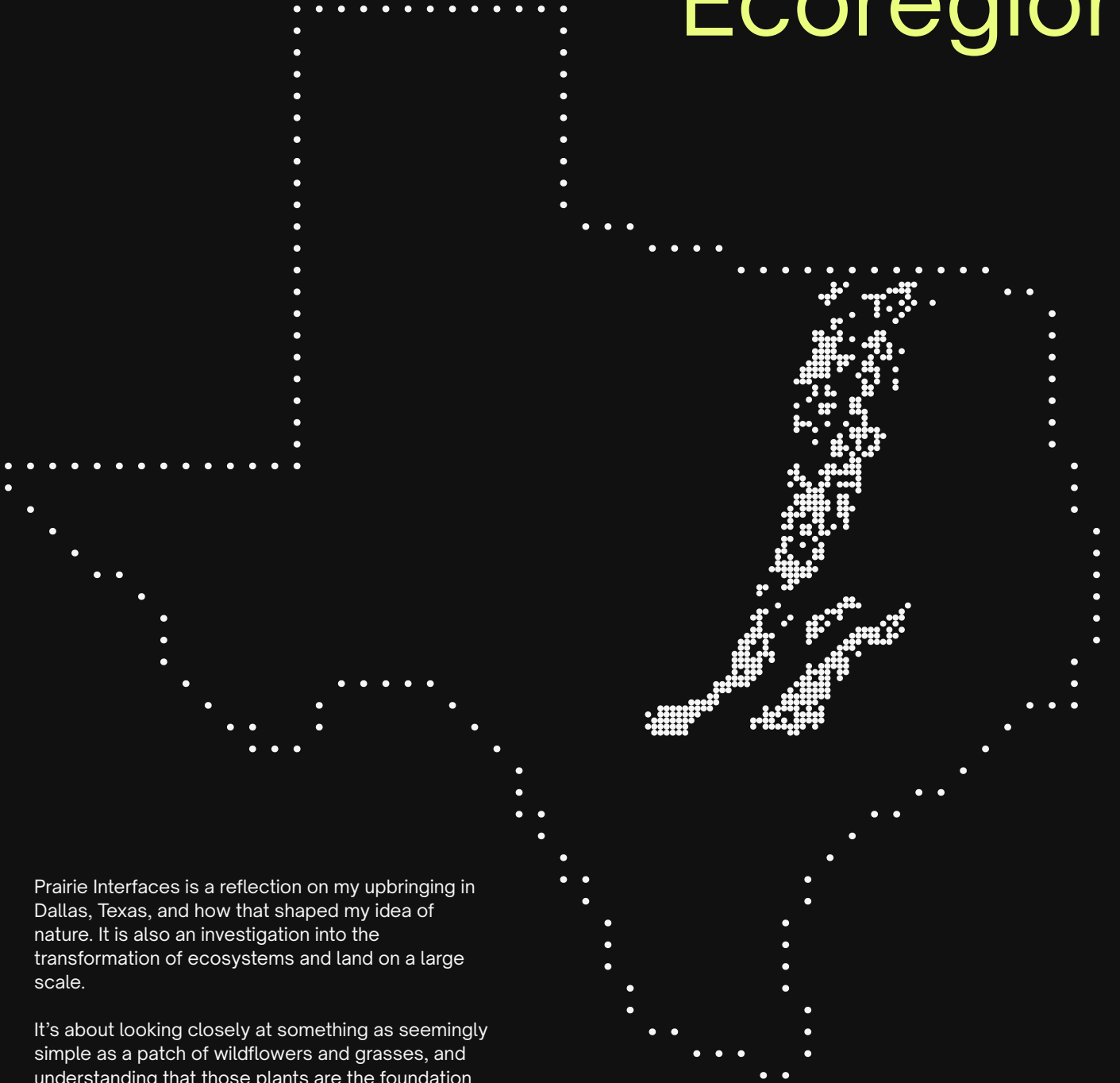
Final outcome and photo gallery

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## Acknowledgements

Thanks to the Waag & Fabricademy team

# Blackland Prairie Ecoregion



Prairie Interfaces is a reflection on my upbringing in Dallas, Texas, and how that shaped my idea of nature. It is also an investigation into the transformation of ecosystems and land on a large scale.

It's about looking closely at something as seemingly simple as a patch of wildflowers and grasses, and understanding that those plants are the foundation for an ever-shrinking ecosystem.

Development of the area for agriculture and real estate, along with the cessation of traditional land management methods, has led to a near complete loss of the original Texas Blackland Prairie.

With less than 1% of the ecosystem intact, what is in store for its future?



# A digital landscape

Trying to imagine the future of an endangered place can be difficult. As Robin Wall Kimmerer puts it, many prairie landscapes in the USA are “functionally extinct.” Restoration and conservation efforts require extensive time, lots of money, and the dedication and effort of entire communities to change their relationships with the environment. This should be the big goal.

In a more immediate sense, how do we sensitize ourselves to an environment we don't get to experience everyday?



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Naturally Dyed

- Logwood
- Madder root
- Cochineal
- Coreopsis
- Black hollyhock (+)
- Weld

A high ratio of dye to fiber weight makes vibrant colors

Hand Knotted Tapestry

Slow, repetitive movements allow for meditation and reflection. All you need is yarn, scissors, backing fabric, and a hook.

Simple and accessible tools and materials make latch hook rug-making a beginner friendly craft.

# Finishing



## Irregular Edges

Each end is cut and woven back into the tapestry individually. This process secures the edges and allows for more organic shapes than typical latch hook finishing methods.

All that is needed for this is good scissors and a small tapestry needle. Patience is also nice to have.

Hand-processed  
textiles + digital  
tools = intuitive  
interactions



# Testing Ideas

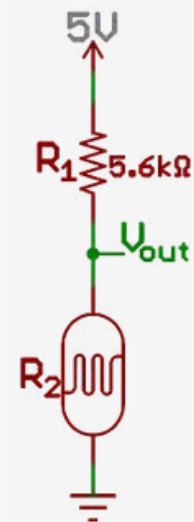


## Variable Resistance and Stroke Sensors

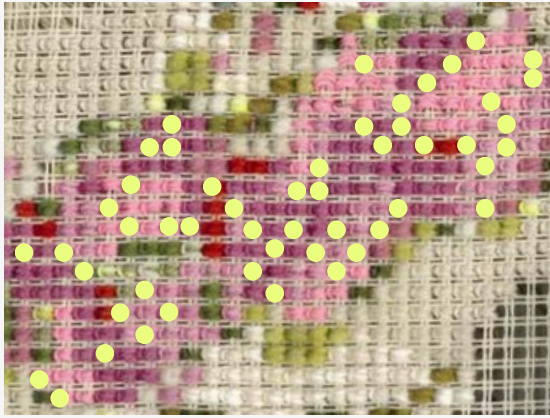
Expanding on research others have done into tufted e-textiles\*, I crafted some small test sensors to gauge how cut-loop pile could conduct current and potentially measure pressure and duration of a touch interaction.

While the conductive threads are buffered by the yarn, stroking or pressing the sensor areas allow the conductive threads to contact each other, essentially causing many short circuits which lower the resistance of the sensor overall.

Voltage dividers reduce noise in the serial data while sensors were not active.



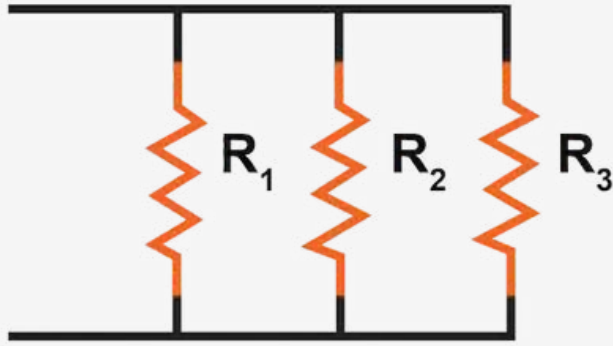
Voltage divider diagram



## Hidden Conductive Threads

Sensor areas are a blend of natural and conductive fibers. The color concentration intuitively guides audiences to interact with the sensor areas. Kitronik's ELECTRO-FASHION conductive thread, buffered by wool and cotton yarn, allows current to flow through the tapestry with each stroke, press, pinch, or fluff of the fibers.





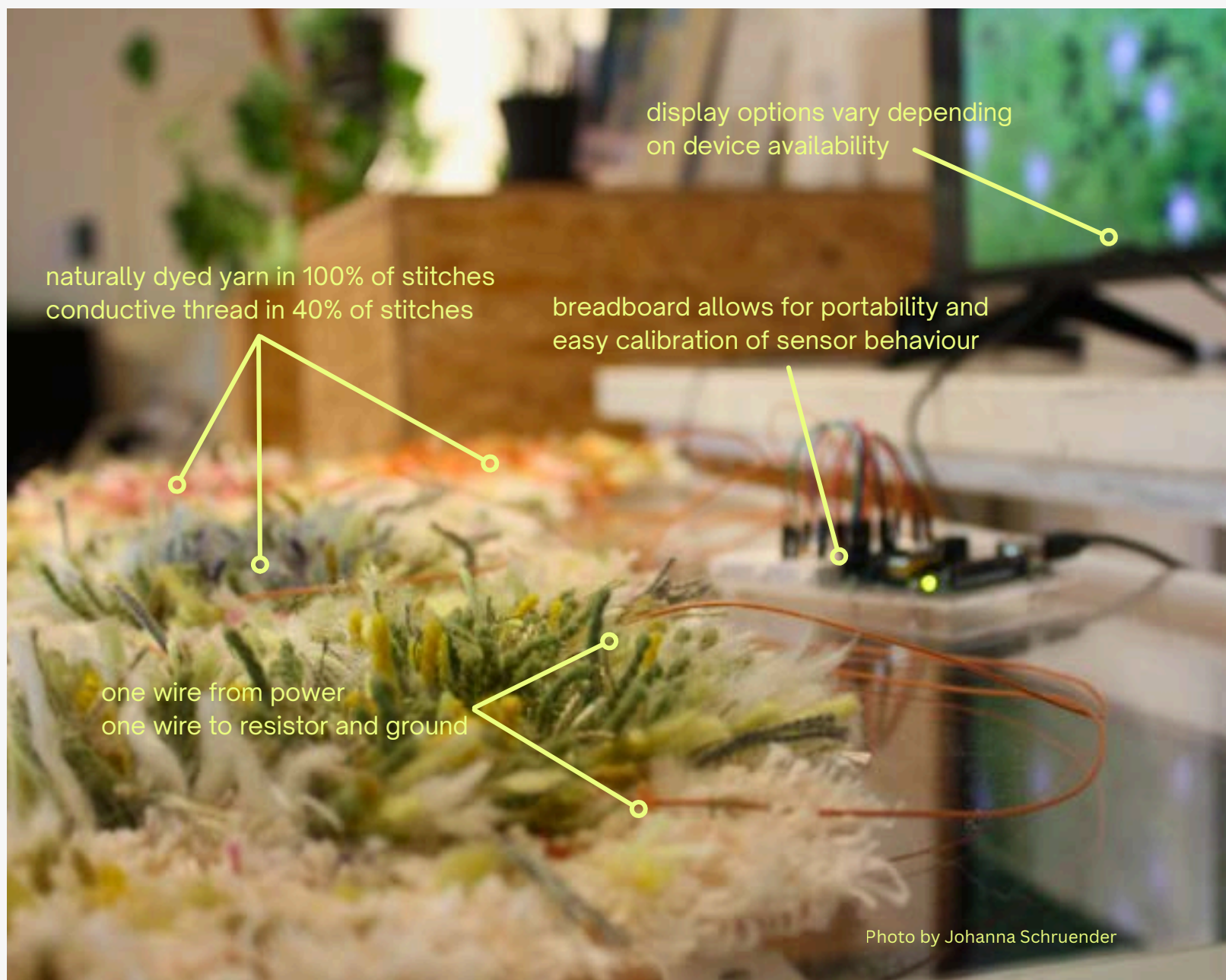
### Parallel Circuit

Parallel circuit diagram

## Electronics Anatomy

Conductive threads knotted alongside natural fibers create multiple paths for current to travel across the sensor. A higher amount threads in contact with each other lowers the resistance of the sensor.

Each sensor operates like a voltage divider following a parallel circuit schematic. One wire delivers power, while a wire at another place in the sensor returns to a resistor, dividing the voltage between an analog pin on the Arduino UNO and ground.





### Custom Wires

Alligator clips secure the wires to the tapestry.



### Vibe Coding

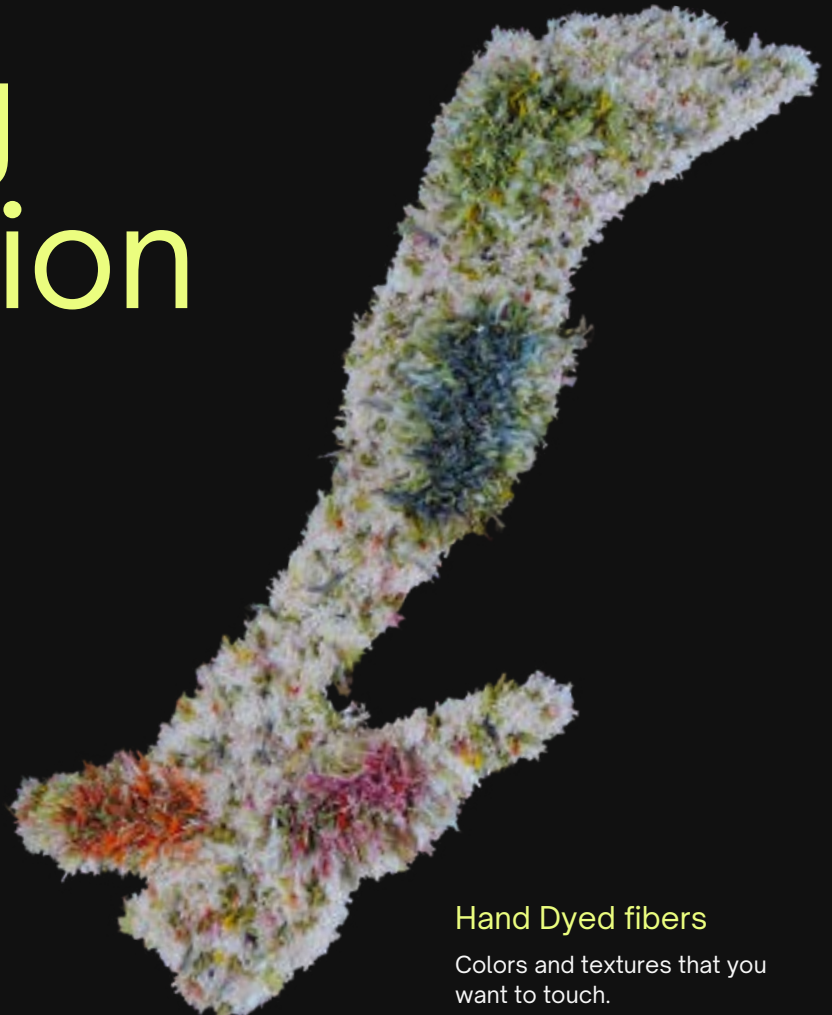
Understand enough about coding with Processing to build a function code with AI guidance.

# Crafting Interaction



### Arduino Uno

Obtain data from interactions and import the values into Processing in order to visualize touch that restores a landscape.



### Hand Dyed fibers

Colors and textures that you want to touch.



## Visualizing Restoration with Processing

The graphics that appear on screen as the tapestry is touched are responsive to two different factors.

The opacity of each image corresponds to the pressure of a touch, caused by a decrease in resistance. Duration of a touch also affects the landscape, as images continue to appear every 10 milliseconds while the sensor is active.

Each of the four colors in the tapestry control the behavior of one wildflower that blooms in the digital landscape.

On a dark background, the glowing affect of each plant compounds as they accumulate.







Photo by Johanna Schruender



# Special Thanks



## to my instructors and mentors:

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More information on the project is available  
at [my Fabricademy site](#).

\*Paper referenced is [PileUp: A Tufting Approach to Soft, Tactile, and Volumetric E-Textile Interfaces, Choi et. al., 2025](#).

